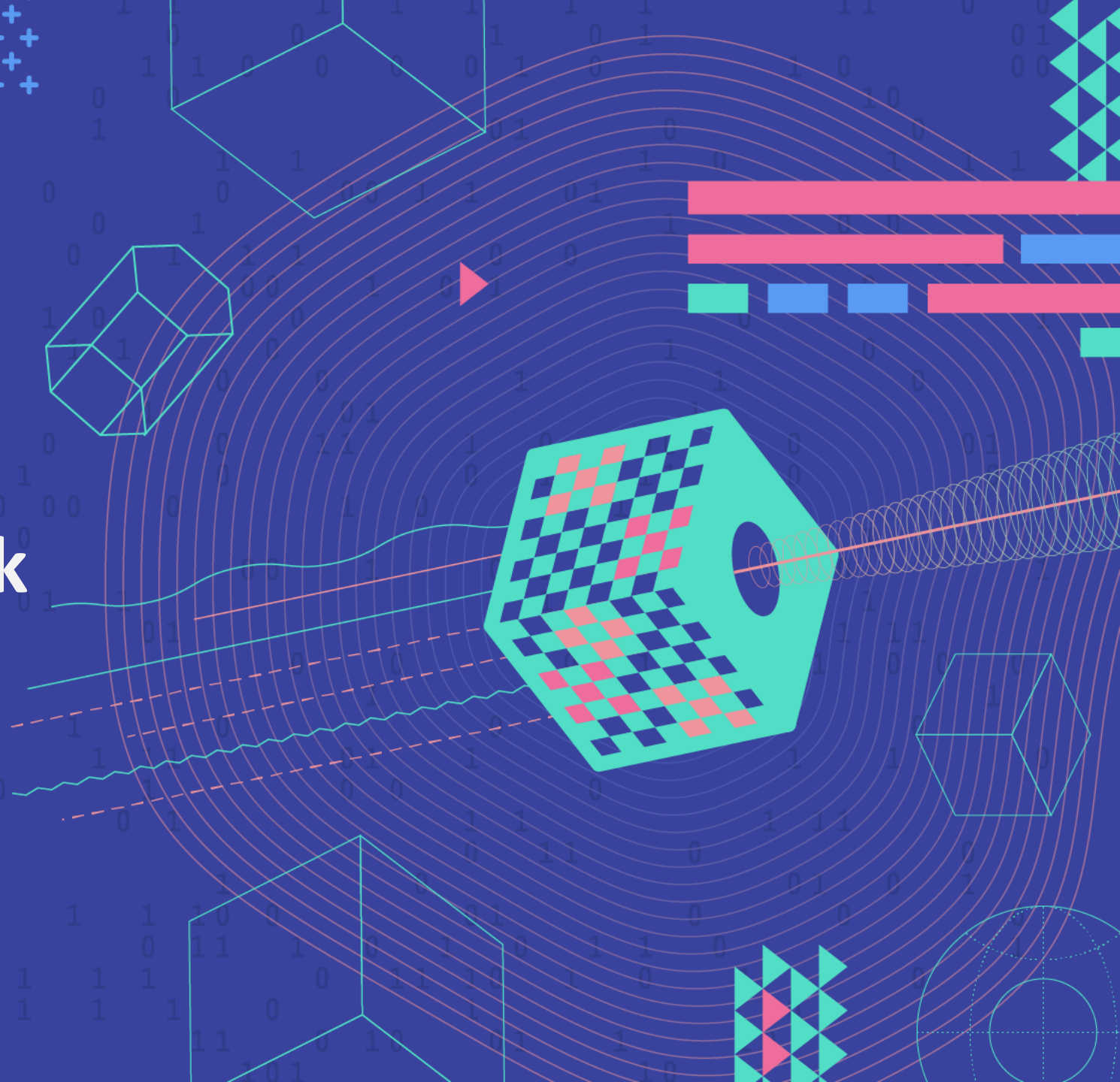
CASSINI #EUSpace
Hackathons & Mentoring

Participant Playbook

9th CASSINI Hackathon: Space for Healthcare

16-18 May 2025



The participant playbook is intended to guide you through the most important information about the 9th CASSINI Hackathon & Mentoring.

Inside you will find information about the tools, platforms, and communication channels you need to make the most out of the weekend.

We are eager to see how you use EU space technologies to support healthcare services!

What you will find in this playbook

1. Core information

- Overview of the 9th CASSINI Hackathon
- The theme and challenges
- Connecting with the EU Space programme
- EU Space programme
- Tools & resources
- Accessing help & support

2. The Hackathon

- The Hackathon events
- The 10 local organisers
- Accessing the data
- The hackathon agenda & rules
- Overview of the hackathon platforms
- The Demo Day & Awards Ceremony

3. Mentoring programme

- Introduction to the programme
- How it will work
- Meet some of our seasoned mentors

CASSINI #EUSpace
Hackathons & Mentoring

9th CASSINI HACKATHON

SPACE FOR HEALTHCARE
16 - 18 MAY 2025

Space for Healthcare | 16 - 18 May

Connecting with issues that are **important for our future**

What **resonates with the next generation** of coders?

In the upcoming CASSINI Hackathon, participants are challenged to create innovative solutions using European space technologies to transform healthcare and improve public well-being.

By leveraging satellite data, healthcare providers, policymakers, and organizations can enhance health services, respond to critical challenges, and promote equitable access to care. From **forecasting disease outbreaks and health risks** based on climate patterns, air quality and/or population movement to **enhancing smart emergency healthcare delivery and services**, space technologies provide powerful tools to safeguard and advance public health. Copernicus, Galileo, and EGNOS offer a comprehensive range of space data to drive healthcare, strengthen mental health, and enable impactful medical innovations.

Space for Healthcare

Challenge #1: Monitoring Disease Outbreaks and Health Risks

Environmental and climate conditions influence public health, creating new risks or amplifying existing ones. Chronic conditions such as asthma, cardiovascular or kidney diseases, and respiratory illnesses are exacerbated by air pollution, extreme heat, and shifting weather patterns. Similarly, **climate conditions can affect the prevalence of vector-borne diseases, like malaria** and the **development of viruses or pandemics**. Space technologies provide a valuable resource to understand and address these issues.

This challenge calls on participants to **develop products, devices, or services that leverage European space data, information and signals** from Copernicus and Galileo or future services using IRIS^2 to forecast and monitor health risks and disease outbreaks. We encourage participants to dive into the areas of:

- **Health Risks Prediction and Mapping**: Use Copernicus data to identify environmental factors, like air quality and heatwaves, that foster health risks and create risk maps and protection tools. Develop predictive models to forecast disease patterns based on climate trends, environmental changes, and population movement and behaviors.
- **Disease Tracking and Outbreak**: Identify hotspots for viruses and diseases like malaria by monitoring environmental changes and water body conditions.
- **Consumer apps and tools**: Create tools that combine satellite data and personal health metrics to provide guidance for mitigating health risks.

Challenge #2: Smart Emergency Healthcare Delivery

Access to timely and effective healthcare is a cornerstone of a resilient society, yet many communities face significant challenges in receiving adequate medical care due to geographical, logistical, or situational barriers. Innovative solutions that harness space technologies can transform healthcare delivery, making it more accessible, efficient, and responsive to diverse needs.

This challenge tasks participants **to develop products, devices, or services that leverage European space data, information and signals** from Copernicus and Galileo or future services using IRIS^2 to enhance healthcare delivery and services. Possible areas for development include:

- **Remote medical delivery (Telemedicine):** Utilize satellite communication to provide remote medical aid (consultations, diagnostics, treatment guidance and monitoring) from afar and improve patient care and engagement.
- **Medical Services Delivery and Logistics:** Create solutions to optimize the delivery of medical aid, supplies, vaccines especially to especially to hard-to-reach or health-crisis-affected (pandemics, natural disasters) regions. Utilize drones, autonomous vehicles on land or water for effective and timely delivery.
- **Support Search and Rescue Operations:** Leverage Galileo's Search and Rescue (SAR) services to provide emergency medical aid to individuals in danger and develop tools to streamline the coordination between rescue teams and healthcare providers.

Challenge #3: Mental Health and Well-Being

Mental health and well-being are crucial for a thriving society but are increasingly impacted by environmental factors like air quality, heatwaves, and urban noise levels. These stressors can exacerbate mental health challenges, affecting individuals and communities. Space technologies provide invaluable resources for understanding these impacts and offering actionable solutions to improve well-being.

This challenge tasks participants **to develop products, devices, or services that leverage European space data, information and signals** from Copernicus and Galileo or future services using IRIS^2 to monitor, assess, and improve mental health and well-being. Possible areas for exploration include:

- **Environmental Stress Monitoring:** Use Copernicus environmental data to analyze factors like sunlight intensity, air pollution, extreme temperatures, and urban green space availability, to assess their effects on mental health.
- **Personalized Well-Being Support:** Design solutions that integrate environmental data with user-specific inputs to recommend daily activities tailored to individual preferences and needs.
- **Urban Management and Planning:** Develop solutions that integrate environmental and mental health indicators, enabling urban planners to create healthier living environments.

Connecting you with the EU Space programme

The EU Space programme consists of several flagship programmes including Europe's Earth observation, satellite navigation, secure communications and space situational awareness programmes. The hackathon challenges participants to use data and signals from Copernicus, Galileo & EGNOS or future services using IRIS2.

Copernicus is the European Union's Earth observation programme, looking at our planet and its environment to benefit all European citizens. It offers information services that draw from satellite Earth Observation and in-situ (non-space) data.

More information

Galileo is Europe's Global Navigation Satellite System (GNSS), providing improved positioning and timing information with significant positive implications for many European services and users.

More information

The European Geostationary Navigation Overlay Service (EGNOS) is Europe's regional satellite-based augmentation system (SBAS) that is used to improve the performance of global navigation satellite systems (GNSSs).

More information

Connecting you with the EU Space programme

The EU Space programme consists of several flagship programmes including Europe's Earth observation, satellite navigation, secure communications and space situational awareness programmes. The hackathon challenges participants to use data and signals from Copernicus, Galileo & EGNOS or future services using IRIS2.

GOVSATCOM

The European Union Governmental Satellite Communications (GOVSAT-COM) programme provides secure and cost-efficient communications capabilities to security and safety critical missions.

More information

EUSST

The Space Situational Awareness initiative will provide Europe and its citizens with complete and accurate information on objects orbiting Earth, on the space environment and on threats coming from space.

More information

IRIS 2

The IRIS2 Satellite Constellation will offer enhanced communication capa-cities to governmental users and businesses, while ensuring high-speed internet broadband to cope with connectivity dead zones.

More information

Spotlight on Copernicus data & information

Never worked with **Copernicus Earth observation data**? No problem!

We have put together some important resources to get you started:

- What is the Copernicus programme?
- Overview of the programme
- The Copernicus services
- Copernicus Data Space Ecosystem
- The Copernicus Browser

Spotlight on Galileo & EGNOS

Just getting started using satellite positioning technologies? We have collected some important resources for you to get started:

- What is Galileo?
- What is EGNOS?
- Galileo-enabled devices
- EO & GNSS Market Report

All the tools you need to succeed!

As participants you have access to invaluable tools, training, and support to help you with your hacking. We provide everything you need, so you can give everything you got!

Jupyter notebook

We wanted to minimise the time needed to process data. That's why we created a dedicated data notebook for each hackathon. The data notebooks contains several resources focused on the hackathon theme. Learn about the Copernicus Data Space Ecosystem, the platform used for the last editions of the hackathons.

Go to Copernicus

Cloud infrastructure

Access virtual storage and computational resources for the duration of the hackathon. The Copernicus Data Space Ecosystem supports this hackathon edition and will enable you to discover, manipulate and download Copernicus data and information. You will also have all the processing power and storage you need to hack your way to success.

All the tools you need to succeed!

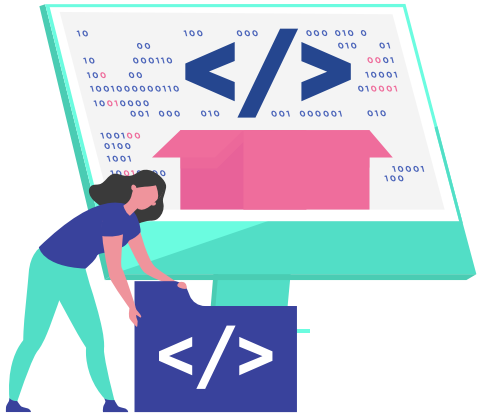
As participants you have access to invaluable tools, training, and support to help you with your hacking. We provide everything you need, so you can give everything you got!

Connect to a satellite

Participants in the CASSINI Hackathons will have the opportunity to connect directly to satellites, a service provided by KINEIS. This will allow you to test and validate your solutions in real-world conditions, using live data from advanced sensors. By integrating this technology, you can enhance your projects with real-time functionality, adding practical and innovative elements to your hackathon experience.

Go to KINEIS

Some of our other tools...



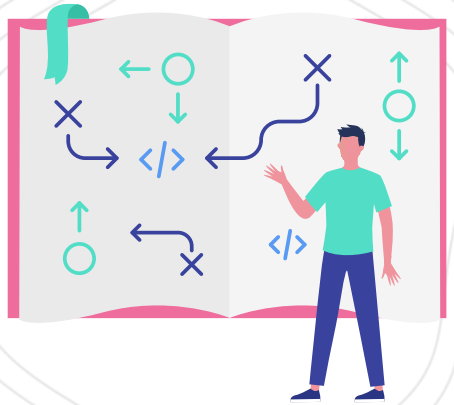
Code repository

Still missing crucial data? We've got you! You will have access to our code repository for space-data sources. Hackers are invited to share their code with the CASSINI Hackathon community as open source on Github.

github.com

Playbook

New to hackathons? No problem. We've prepared two playbooks that will allow you to make the most of your first hackathon experience. Access helpful tips on how to face challenges, where to go if you need support, and what tools you'll be required to use throughout the event in the Participant Playbook. The Business Design Playbook guides you to discover, build and tap into business opportunities with your ideas.



Business Design Playbook

Participant Playbook

Looking for additional resources?

Here is a collection of **publicly available** trainings:

▶ The EUSPA Space Academy offers entrepreneurs a free and customisable online development programme. What's in it for you?

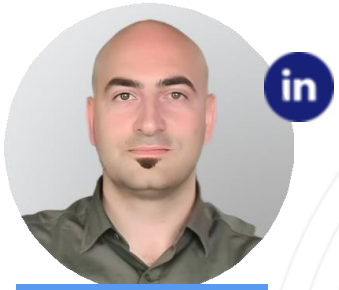
- Tailor your learning path spanning **business and technical** Copernicus & Galileo know-how
- Access **Q&A and workshop sessions with seasoned trainers** ready to guide you in the space entrepreneurship world
- **Book online mentoring sessions with +30 experts** from diverse backgrounds open to help you start or scale up your business.

EUSPA Space Academy

Meet the core team behind the hackathons & mentoring

Got questions? One of us will get back to you with the answer.

Dany Robberecht



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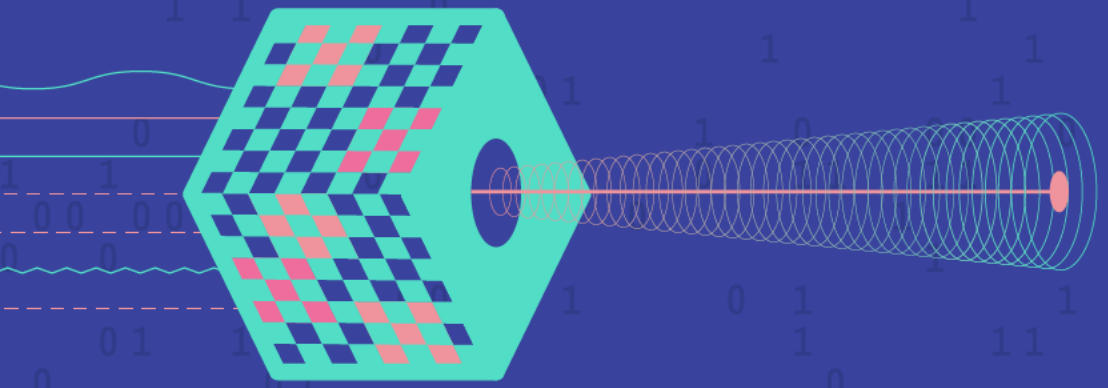


The Hackathon tools

In this section, you will learn about the information on the available tools you can use during the Hackathon

Data & Tools

EO data & APIs

The Copernicus Data Space Ecosystem is an open platform providing access to Copernicus Earth observation data

Satellite IoT Connectivity

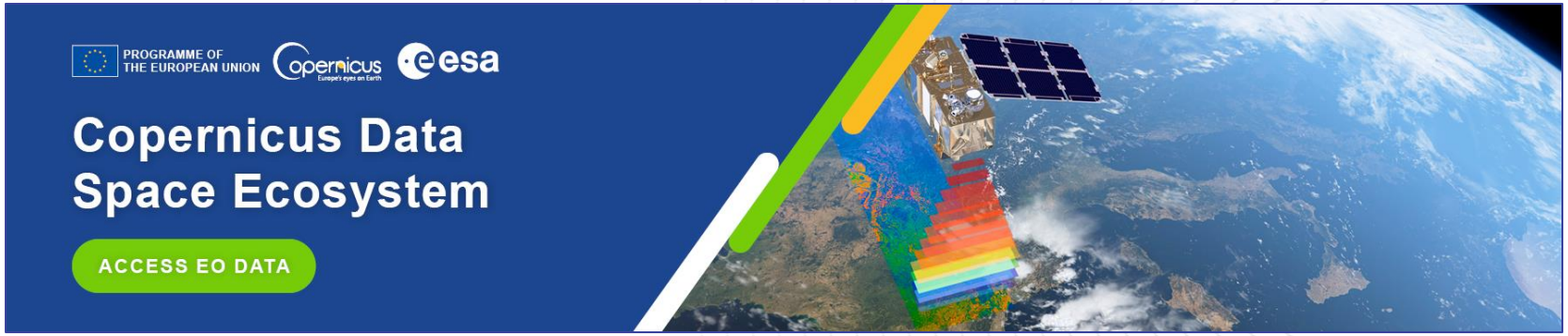
Get real-time data (like temperature, humidity etc) by connecting to a satellite.

Visualization Platform

Collect, visualize and use the collected data.

The Copernicus Data Space Ecosystem

- We are working with the **Copernicus Data Space Ecosystem** to give you free access to cloud processing infrastructure and data storage for the duration of the event.
- The package includes:
  - **Processing tools:** Access APIs, versatile tools and web-based environments
  - **Data access:** Data & information at your fingertips
  - **Training & support:** Training sessions and technical support during the Hackathon Weekend



The Copernicus Data Space Ecosystem

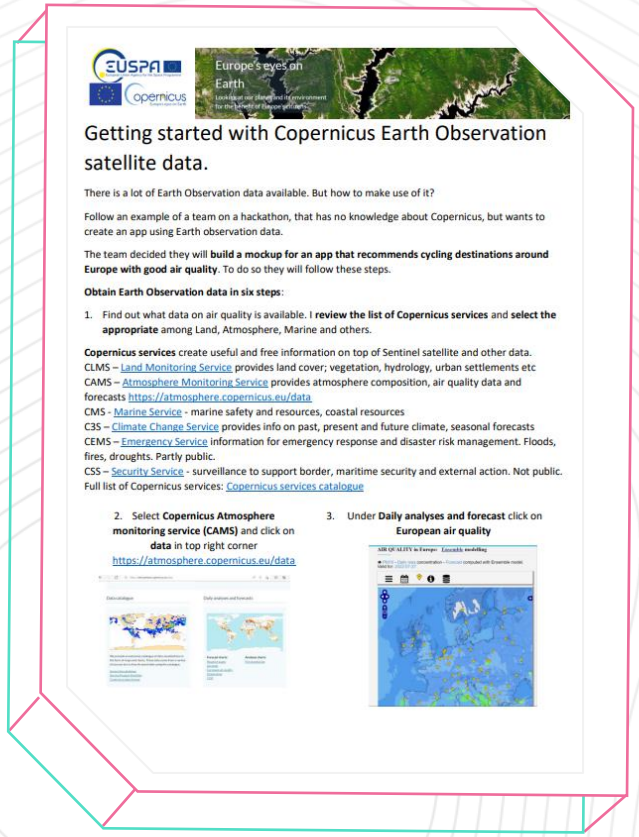
- You can find **tailored on-demand training videos** on the Copernicus Data Space Ecosystem by visiting our Tools page. These includes trainings on:
  - Introduction to Copernicus, the Data Space Ecosystem, and browser
  - How to use the Copernicus Data Space Ecosystem APIs
  - Introduction to Galileo & EGNOS
- Alternatively, you can also visit dataspace.copernicus.eu for further features, tutorials and highlights demonstrating the use of the Ecosystem, including:
  - Exploring the Copernicus Data Space Ecosystem
  - Sentinel data
  - Copernicus Browser
  - openEO

Other useful links:

- Documentation Site
- Custom Scripts Repository
- Jupyter Lab
- Request Builder
- Sentinel Hub API Documentations
- openEO Algorithm Plaza
- Service Desk
- Copernicus Browser
- Github Notebook Samples Repository
- openEO web editor

Getting started with Copernicus Earth Observation satellite data

- EUSPA has created a **simple guide on how to access Copernicus data** for people who hear about it for the first time.
- This file is not exhaustive and is meant to be used as a simple guide on how to access various Copernicus data. It is a good **starting point** if you want to learn more about Copernicus!


Getting started with Copernicus Earth Observation satellite data.

There is a lot of Earth Observation data available. But how to make use of it?

Follow an example of a team on a hackathon, that has no knowledge about Copernicus, but wants to create an app using Earth observation data.

The team decided they will **build a mockup for an app that recommends cycling destinations around Europe with good air quality**. To do so they will follow these steps.

Obtain Earth Observation data in six steps:

1. Find out what data on air quality is available. I **review the list of Copernicus services** and **select the appropriate** among Land, Atmosphere, Marine and others.

Copernicus services create useful and free information on top of Sentinel satellite and other data.
CLMS – Land Monitoring Service provides land cover; vegetation, hydrology, urban settlements etc
CAMS – Atmosphere Monitoring Service provides atmosphere composition, air quality data and forecasts https://atmosphere.copernicus.eu/data
CMS - Marine Service - marine safety and resources, coastal resources
C3S – Climate Change Service provides info on past, present and future climate, seasonal forecasts
CEMS – Emergency Service information for emergency response and disaster risk management. Floods, fires, droughts. Partly public.
CSS – Security Service - surveillance to support border, maritime security and external action. Not public.
Full list of Copernicus services: Copernicus services catalogue

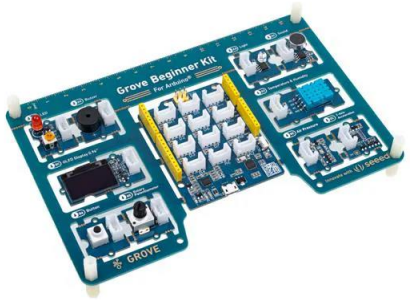
2. Select **Copernicus Atmosphere monitoring service (CAMS)** and click on **data** in top right corner https://atmosphere.copernicus.eu/data

3. Under **Daily analyses and forecast** click on **European air quality**

Download the Guide

Satellite IoT Connectivity Package

Participants are encouraged to pick up a challenge that may involve IoT. To make this possible you will be provided with the following:



SeeedStudio Grove Beginner Kits for Arduino

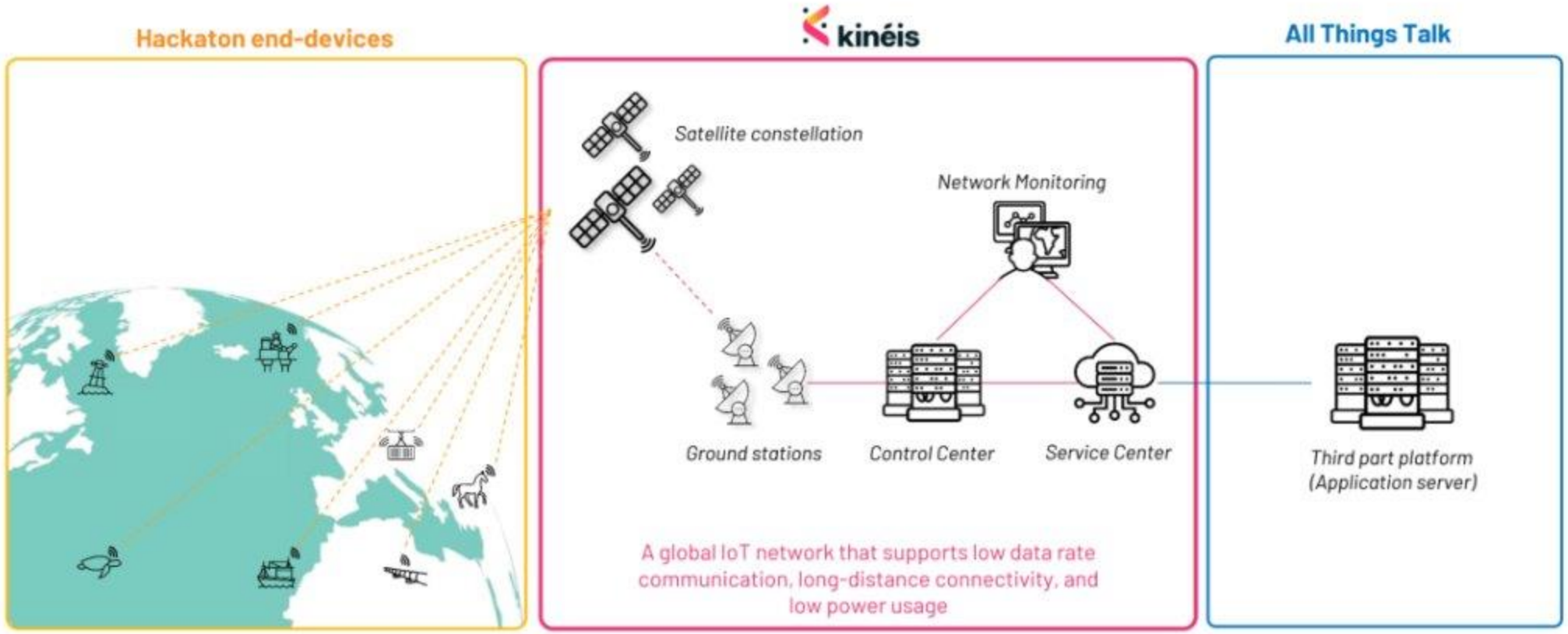
Arduino Uno Rev3 board

Kineis KIM1 SPP kit

AllThingsTalk by ALSO

Access to All Things Talk platform

System architecture with Kineis



The sensors collect data
(Grove Beginner Kit For Arduino)

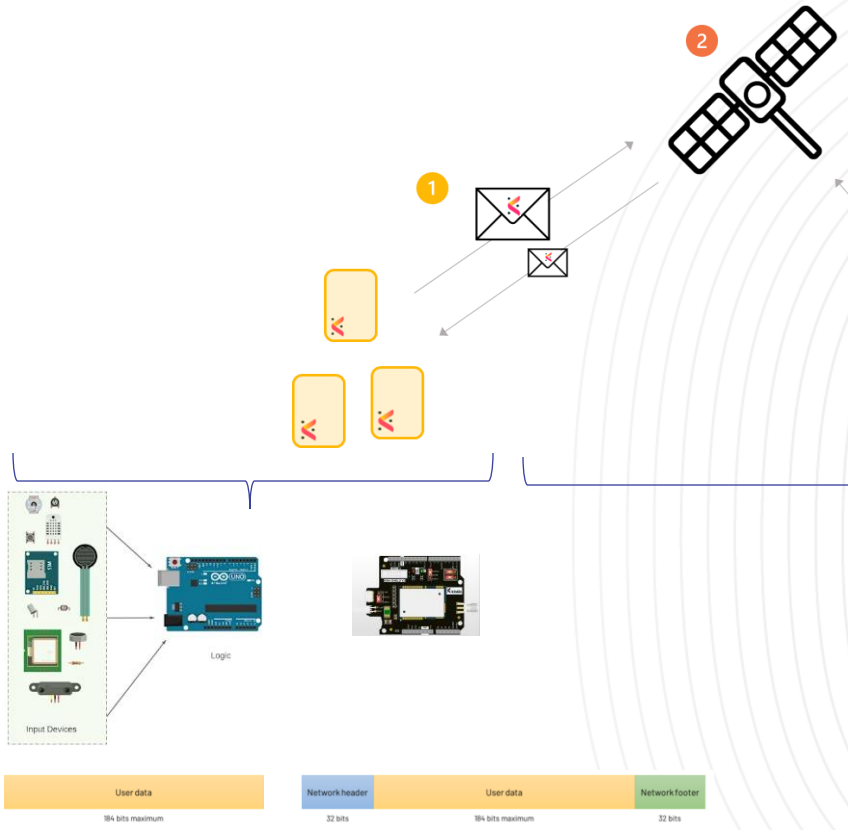
Data are sent directly to a satellite and are being transmited to ground stations

Data are collected to the All Things Talk platform to be visualized

System architecture with Kineis

Find a step-by-step guide here

Plug the KIM1 SPP in the Grove Beginner Kit For Arduino



MQTT
Codec : KIMV1
Values :
CRC_OK : true
MESSAGE_COUNTER : 370
RAW_DATA : ***184bit User data***

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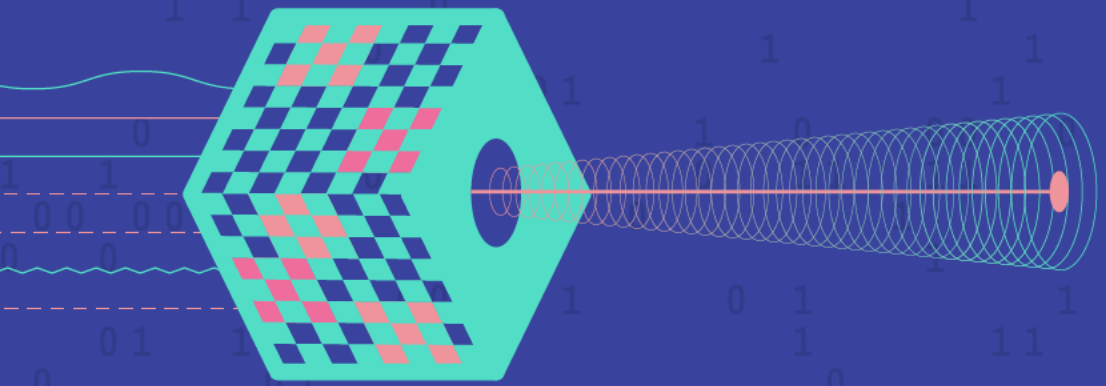


The Hackathon

In this section, you will find all the information you need to participate in the hackathon.

The CASSINI Hackathon event

Hackathon activities are split across **three main events**:

1. **Big ideas campaign**

   28th April – 9th May

2. **THE HACKATHON**

   16 – 18 May

3. **Demo day + Awards**

   21st May

The 9th CASSINI Hackathon takes place in 10 different locations

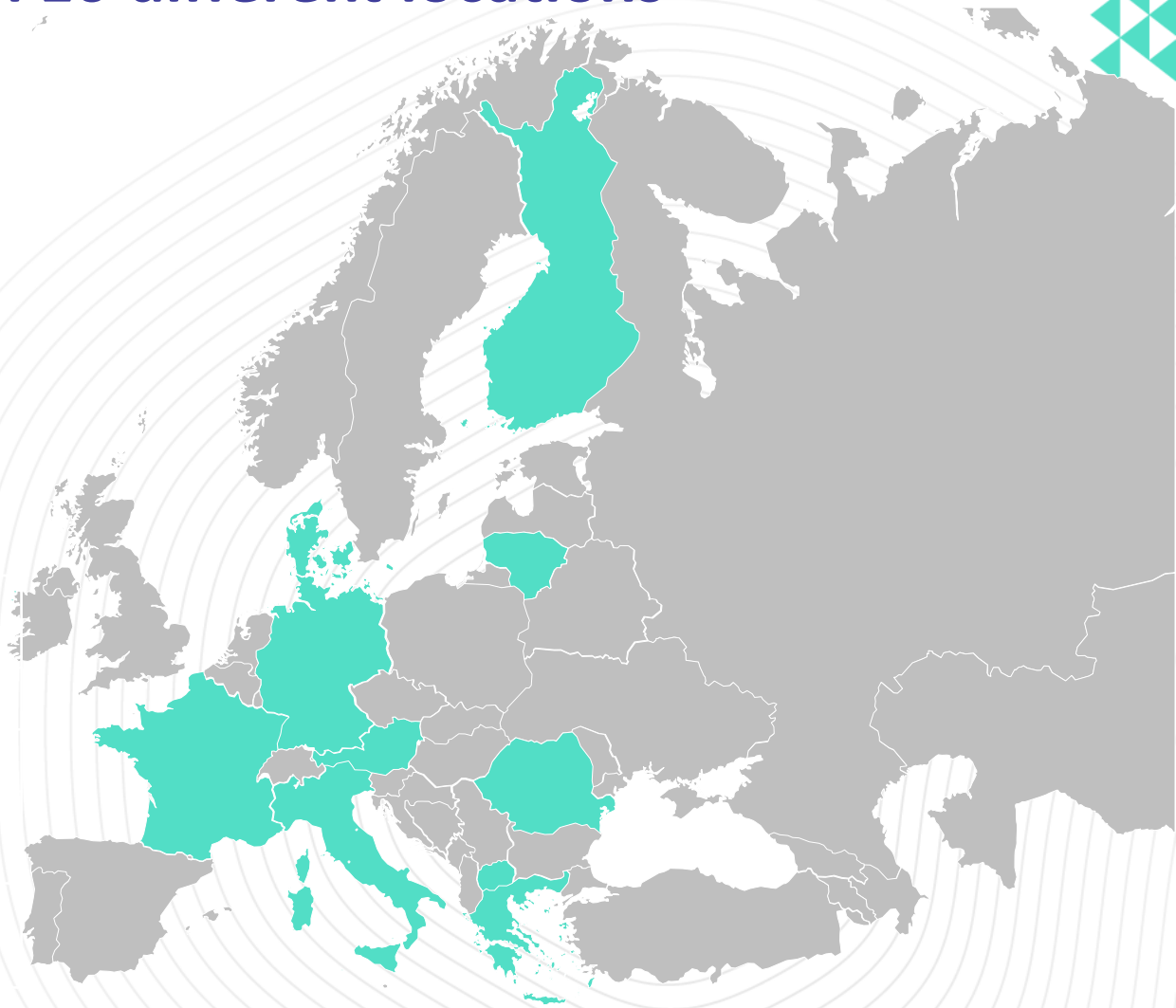
All students residing in Europe, entrepreneurs, engineers, designers, researchers, policy makers, professionals, and others are welcome to participate. **No previous experience is required!**

On-site at one of the hackathon locations or remotely

No previous space experience is required!

Check out our 10 locations:

- Austrian Space Forum (OeWF), Austria
- Aarhus University, Denmark
- Ultrahack , Finland
- International Space University, France
- Vision Health Pioneers Incubator, Germany
- Envolve, Greece
- TESEAS, Italy
- Baltic Sandbox, Lithuania
- Netaville., North Macedonia
- Institute of Excellence in Entrepreneurship (IdEA), Romania



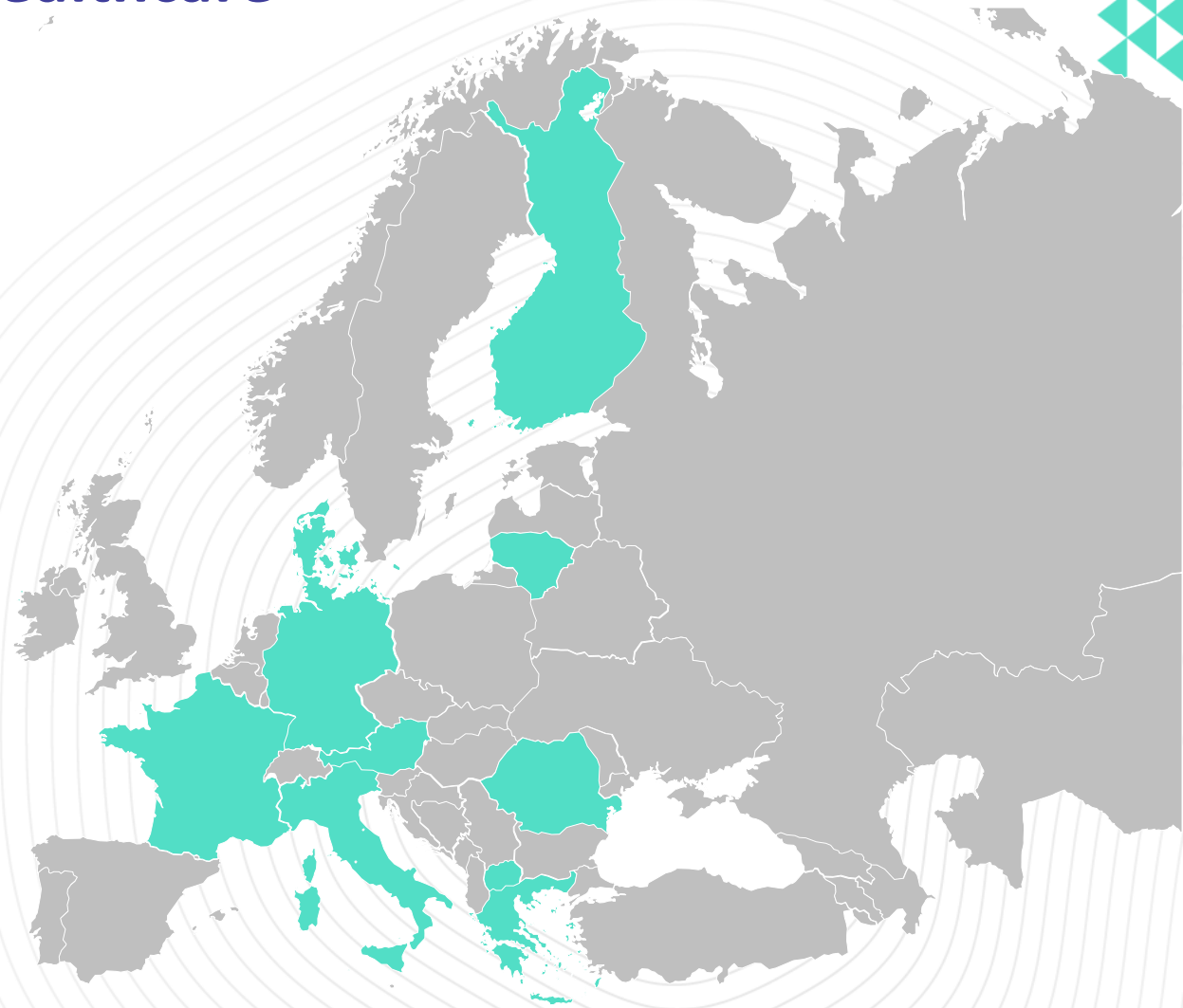
Open for everyone with a passion for Healthcare

All European students, entrepreneurs, engineers, designers, researchers, policy makers, and others are welcome to participate:

On-site at one of the hackathon locations or remotely

No previous space experience is required!

- Online resources
- Relevant datasets
- Hybrid experience
- Interesting speakers
- Access to experts
- Cool prizes



Big Ideas Campaign

The Big Ideas Campaign is a series of evening events between **28 April – 9 May** filled with exciting and invaluable sessions intended to get you warmed up for the Hackathon Weekend!

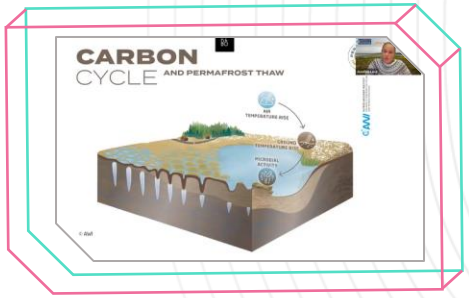
Join the campaign and take advantage of the benefits!

Training

Learn about EU space technology, Copernicus, Galileo & EGNOS. We'll make sure you are equipped with the knowledge and tools to succeed during the hackathon.

Inspiration

Get inspired by our success stories, past winners and training sessions we prepared so you can change the way we do finances!



Networking

Take advantage of the Pan-European network and engage the community!

Get to know the hackathon rules

General rules

- No development may start before the actual date and time of the Hackathon Weekend. Please do not begin hacking before **before Friday 16th May 2025 at 18:00 CEST.**
- To ensure a level field for all contestants, all code must be created by the team, during the Hackathon Weekend.
- You are permitted to use publicly available or openly licensed APIs, SDKs, frameworks and other software libraries for your project.
- Any software development tools and/or programming language can be used.
- Teams that violate these rules will be automatically disqualified.

Hacker eligibility criteria

- Apply as an individual
- 18 years or older
- Reside in European Union or a non-EU country associated with Horizon Europe

Team criteria

- Minimum 3 & maximum 8 team members
- At least 1 with a technical profile and 1 with a business profile
- Have an idea to work on

For full information about participating in the CASSINI Hackathons, read the **Rules of Contest**

Participating in the virtual hackathon

Click the register button on our website cassini.eu/hackathons/ and engage with us across these platforms:

Hackathon platform

Want to register as a participant? Great! Head to the hackathon platform, register, and join/form a team.

To hackathon platform

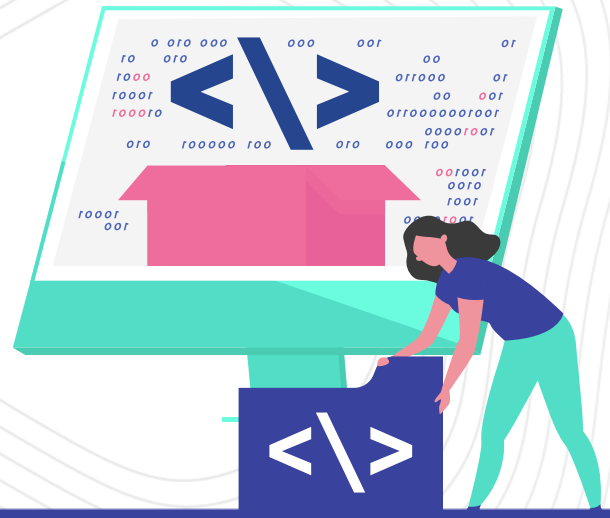
TAIKAI

Community platform

Keep up to date with the latest hackathon information, find team-mates and ask questions on our community platform.

To community platform

DISCORD



Form or join a team on the hackathon platform

Sign into your TAIKAI account here and follow the steps to create or join a team and submit your hackathon project.

1. Create or join a team

Already know who your team members are?
Create a team and share a link.
Looking to join a team? Head to Discord to meet fellow participants. Check out the #find-your-team channel

2. Select a challenge

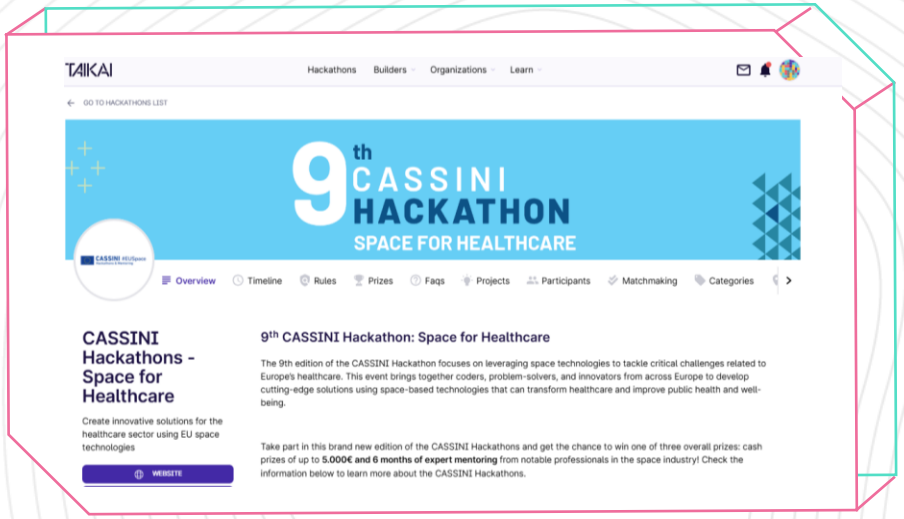
Choose from one of the three challenges:

- Monitoring Disease Outbreaks and Health Risks
- Smart Emergency Healthcare Delivery
- Mental Health and Well-Being

3. Submit your project

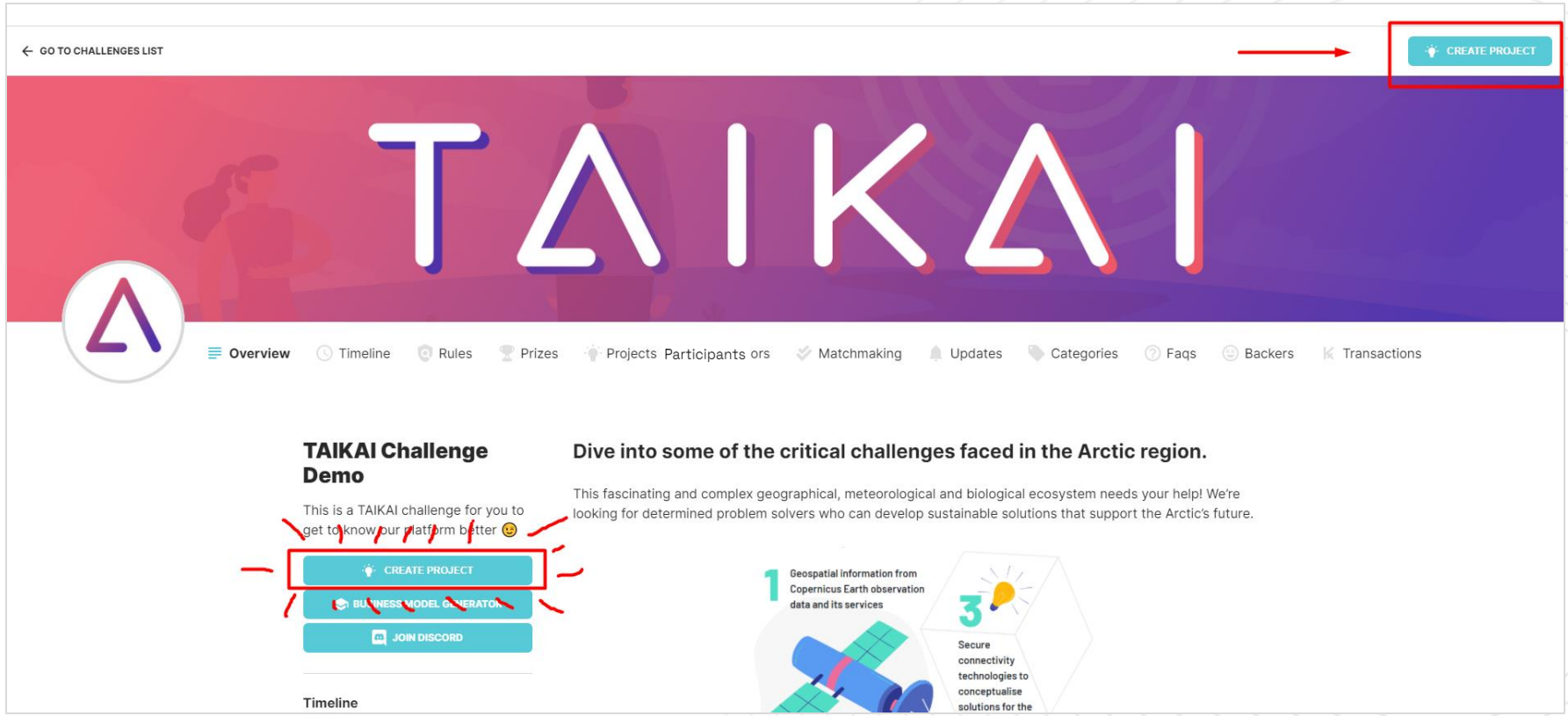
Make sure to submit before the deadline:
15:00 CEST, Sunday 18th May 2025

TAIKAI



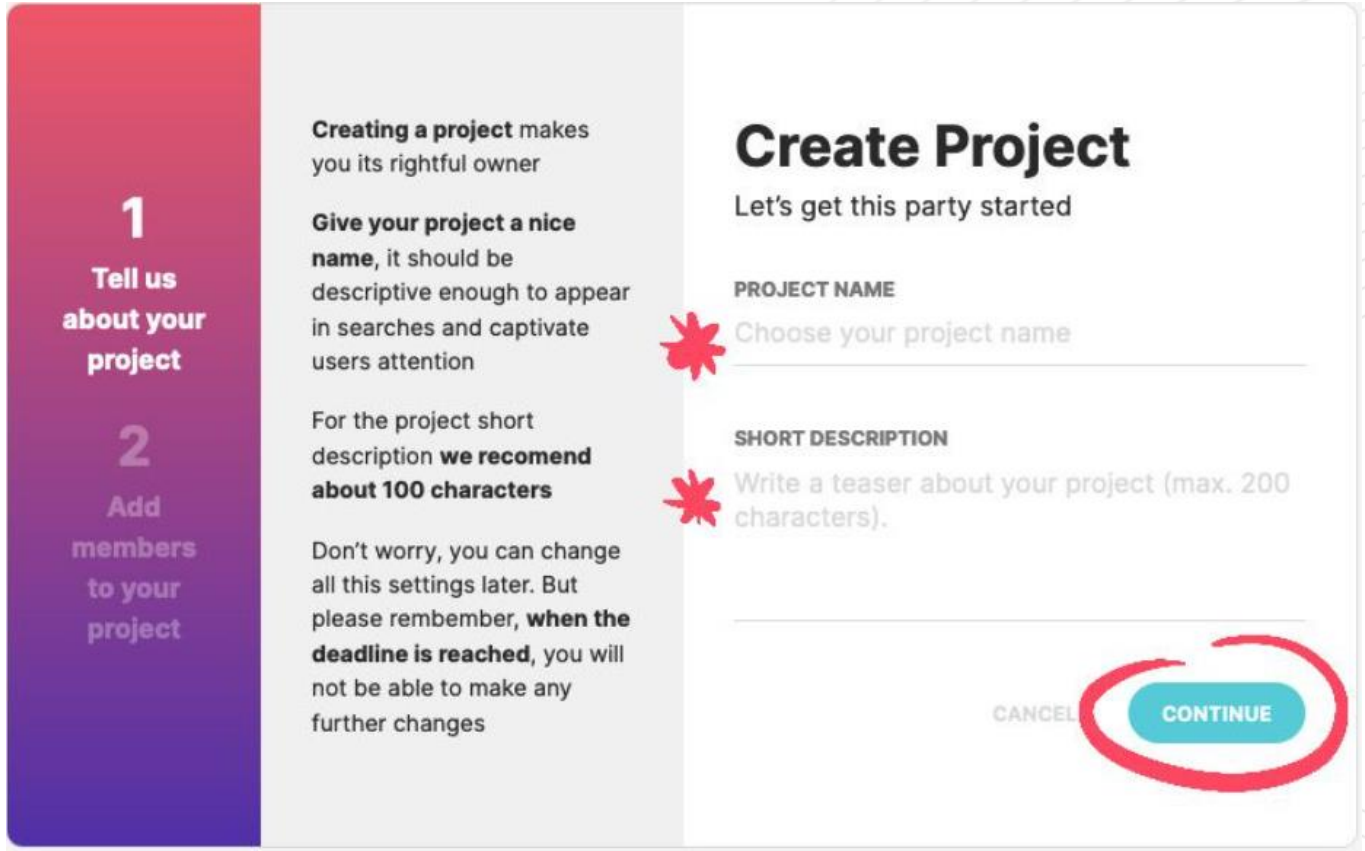
TAIKAI - Project creation

To create a project, participants need to navigate to the **"Create Project"** button on the screen's **top right or on the left sidebar.**



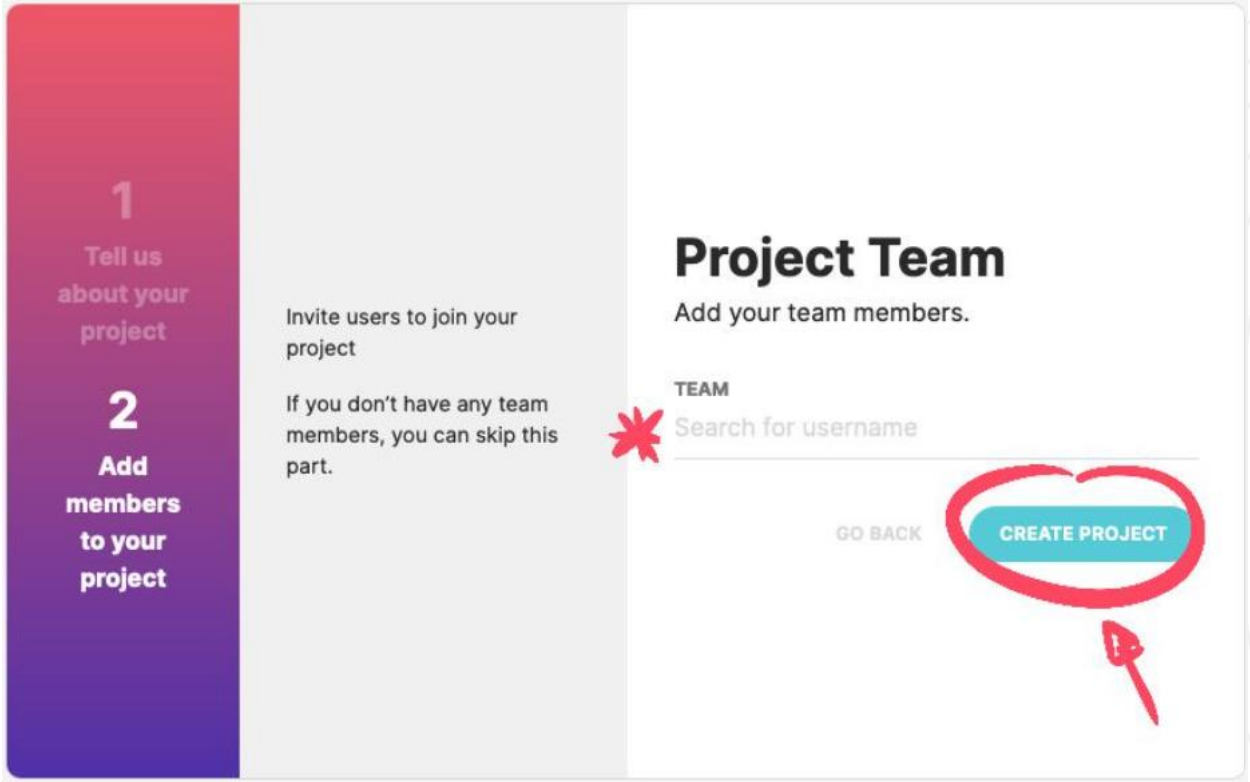
TAIKAI updates – Create a project

They will then be prompted to provide the **title** of their project and a **short description** of what they are planning to build.



TAIKAI updates – Create a project

The final step is to add their team members to the project. All team members need to be registered on the TAIKAI platform and registered to the challenge. Once they have completed adding their team members, they must click on "Create Project" button.

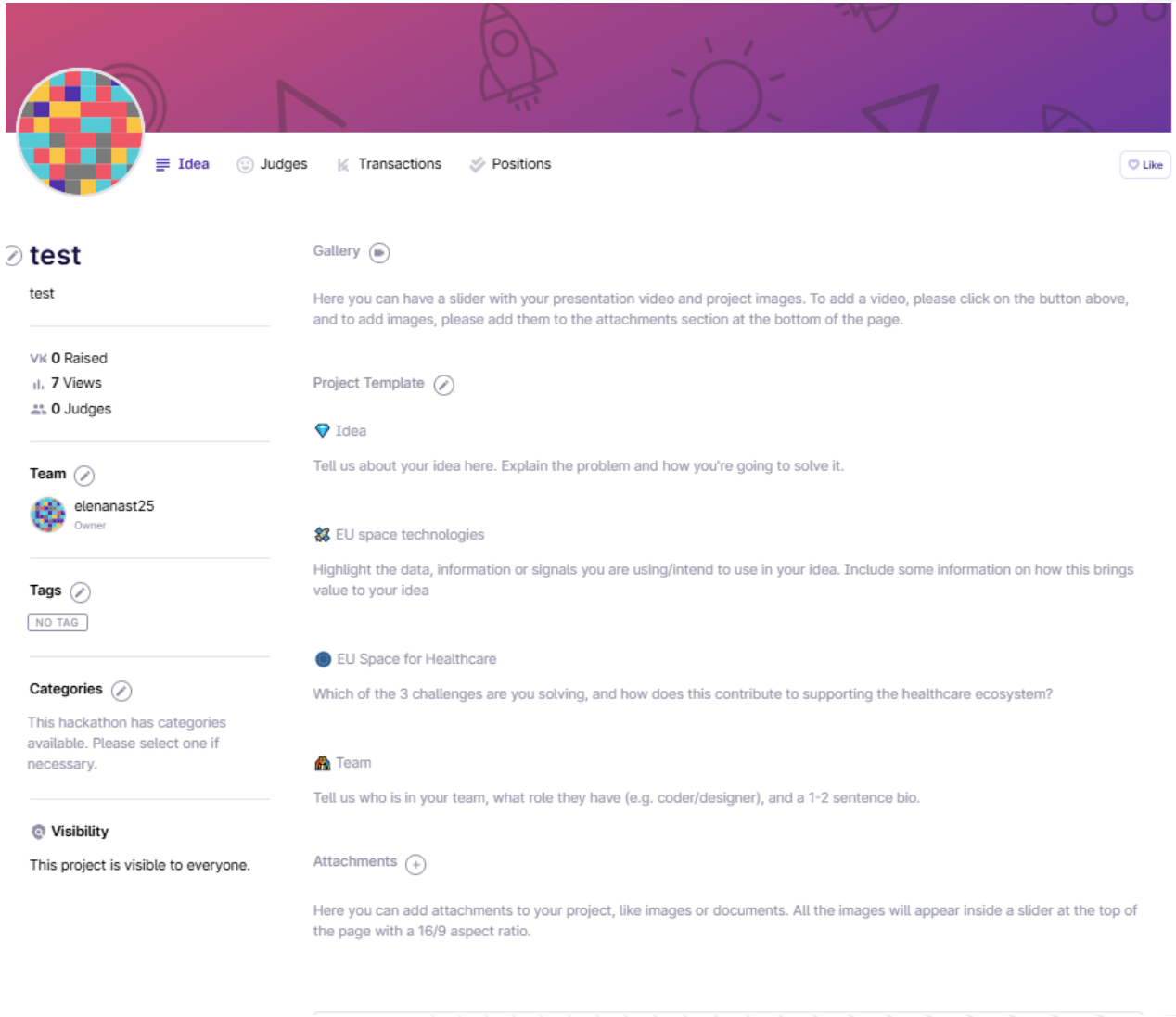


Once they have created their project, they can then fill out their project details and complete it during the hackathon

Project details

All team members must be registered to the same hackathon location.

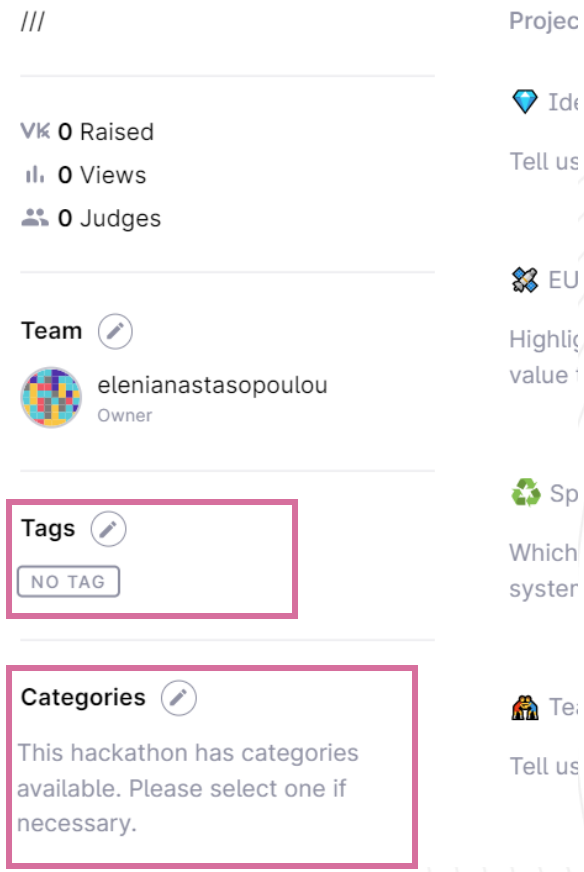
All projects must have the **correct tag** (hackathon location).



Project details

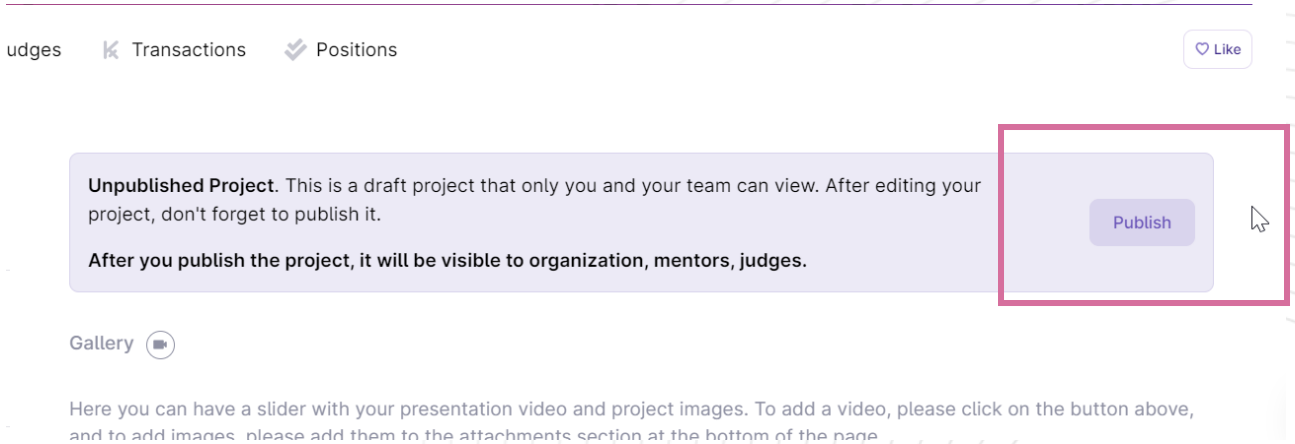
Add your tag and select your country

Click on the categories and select the hackathon challenge you are addressing.



Project details

When you are ready publish your project!



TAKAI's participants journey – Forming a team

If you are a **team leader and already have a project in mind**, but don't yet have a full team, follow these steps to create your **dream team**:

1. Create your project and indicate you're looking for teammates

- **Visit TAIKAI** and create your project
- Once you publish your project, go to your project dashboard and click on the ''Positions'' tab
- Describe the details of the position

2. Scout for participants

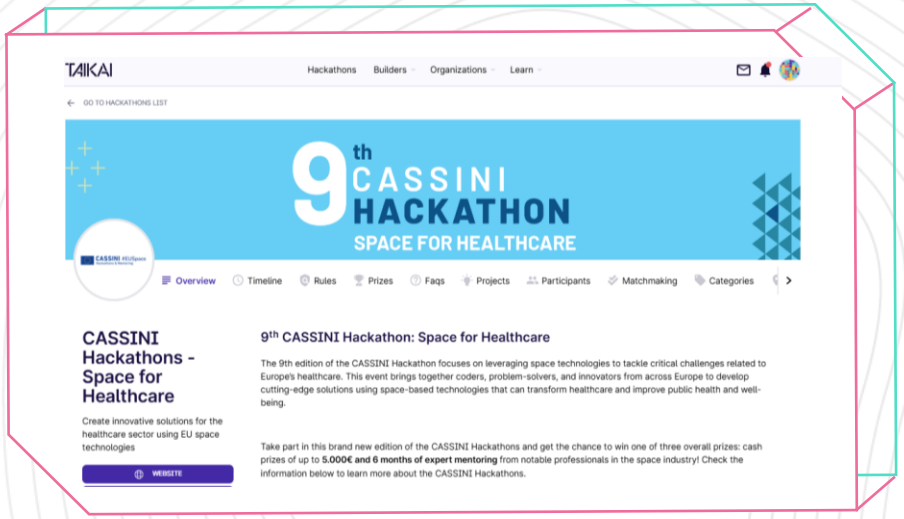
Find your ideal team member:

- Go on to the **'Participants' tab**
- Search for participants from your hackathon location
- Check 'Looking for a team' tag
- Filter by skillset

3. Contact future team members

Message the person, introduce yourself and your project.

TAIKAI



TAKAI's participants journey – Joining a team

If you are an **innovator looking for a team**, follow these steps to find your dream team:

1. Indicate your availability

- **Visit** TAIKAI
- **Click** on the ''PREFERENCES'' tab on the left
- Click ''Yes'' under the Matchmaking section

2. Scout for projects

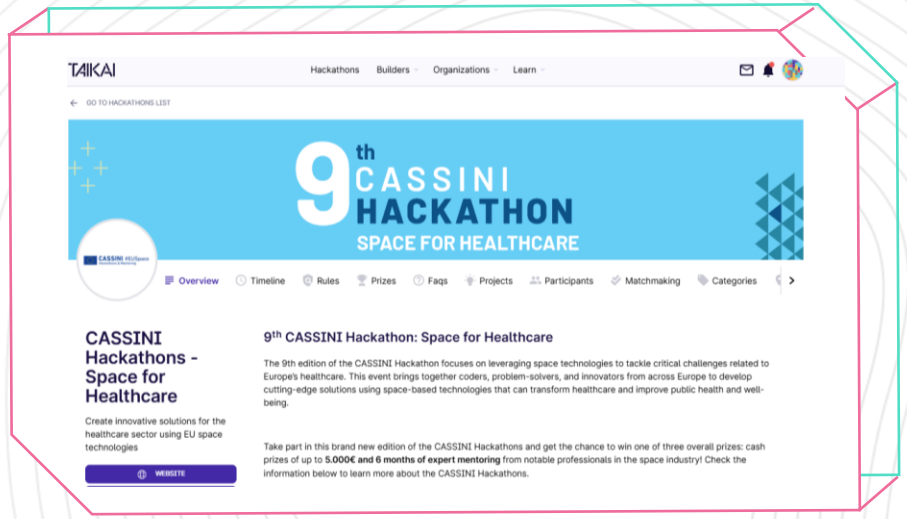
Find your ideal project:

- Go on to the **'matchmaking' tab**
- Search for projects from your hackathon location
- Check the skills needed for the project
- Choose your ideal team

3. Contact project owner

Message the person and introduce yourself.

TAIKAI



TAKAI's participants journey – Changing location

Interested in trying out a **new location**?
You can do so by editing your registration on TAIKAI!

1. Go to our platform page

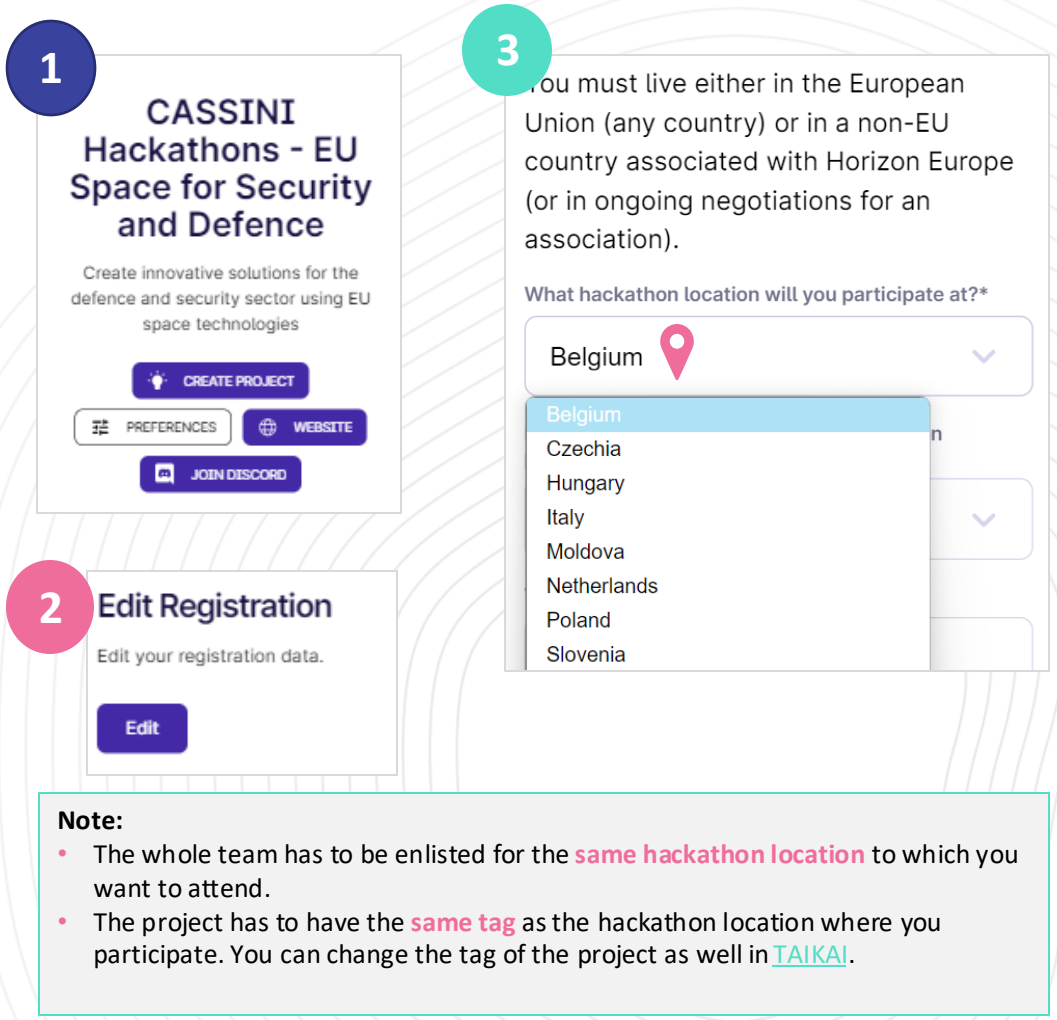
- **Visit** TAIKAI
- Log in to your TAIKAI account
- visit the Hackathon's platform page
- Click on 'Preferences'

2. Edit your registration

- Click the 'Edit' button on '**Edit Registration**'

3. Choose a new location

Select the hackathon you wish to participate in from the local organiser list and save your preferences.



Note:

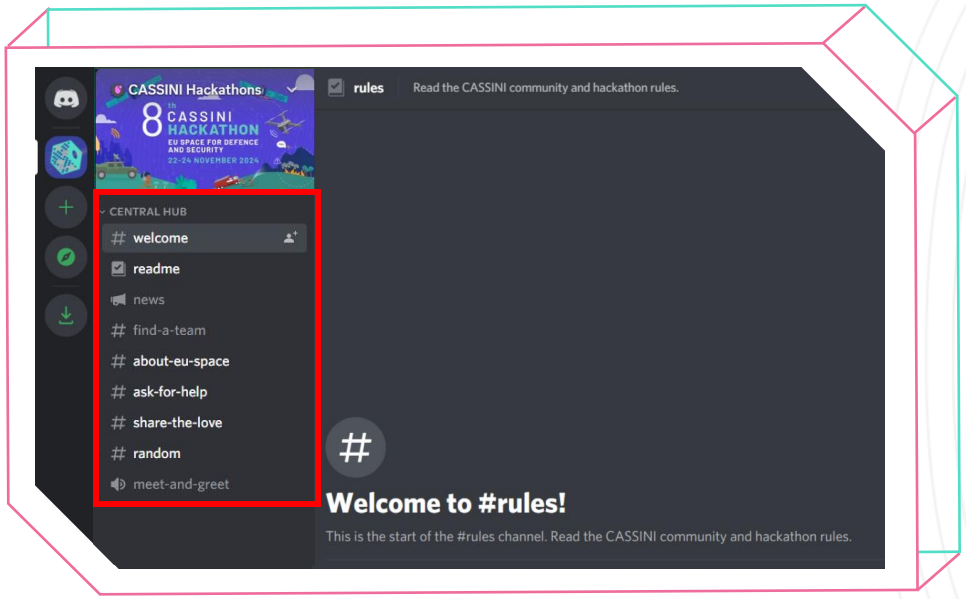
- The whole team has to be enlisted for the **same hackathon location** to which you want to attend.
- The project has to have the **same tag** as the hackathon location where you participate. You can change the tag of the project as well in TAIKAI.

Engage with the hackathon community on discord

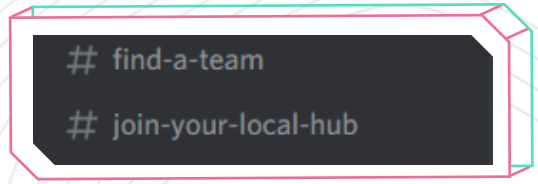
Interact with your **local organisers and fellow participants** on **Discord**.

This is where the **main hackathon communication** will take place throughout the weekend.
You can use the different channels to ask questions, have a chat, and hear
the latest information about your local hackathon.

Central Hub



Local Hackathon



DISCORD

Demo Day & Award Ceremony

May **21**
Wednesday

18:00 (CEST)

During the Demo Day & Award Ceremony the 10 winners of the local hackathons will pitch their projects.
A jury of experts will evaluate the projects and select the three overall winning teams who will win **100 hours of expert mentoring** each.

Join the demo day to…

- Meet the top teams from the 10 local hackathons
- Watch 10 innovative project pitches
- Discover the 3 overall winners of the hackathon

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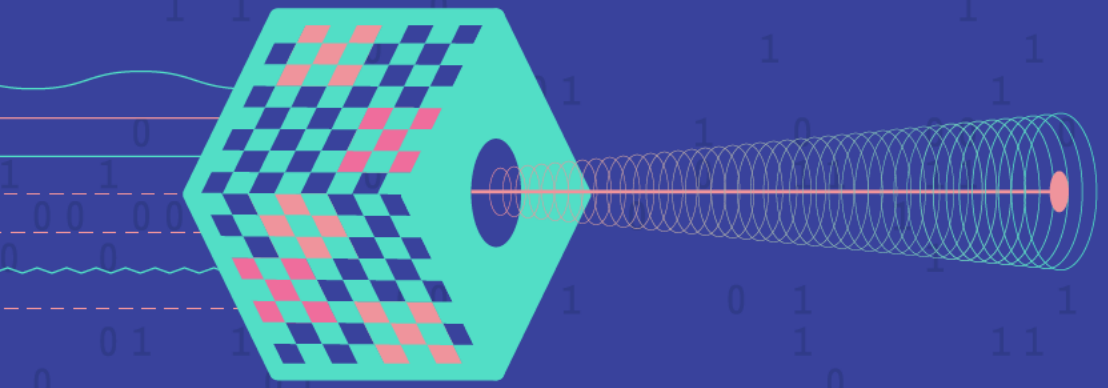
Hackathons & Mentoring



Mentoring Programme

In this section, you will learn about the mentoring programme available to the top 3 teams selected in the hackathon.

Each winner has access to our mentoring programme

Three winning teams can benefit from 100 hours of mentoring each spread across the six months following the event.

How does it work?

Each team will have a lead mentor who will guide them through the mentoring programme.

The lead mentor will connect the teams with different expert mentors who are available in 5-hour blocks.

Teams will monitor their progress over the six months on their path to creating a sustainable and commercially viable solution!

Meet some of our mentors

Each of the three overall winners will work with our expert mentors. Their backgrounds range from product development, Earth observation and GNSS through to business development, marketing, design and more. Here are a small selection:

Carlos Bello Marcos
INNOVA4EU

Dimitris Matsakis
P.L.A.N.

Dr. Johanna Braun
Innovation, Venture & Sustainability

Dennis Kibirev
Mesh Ai, FrontierFunder

Floriano Bonfigli
AC75

Pablo Garrido
EIT Urban Mobility

Alexandre Mencik
Space Platform

Pedro Branco
Virtual Angle B.V.

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THANK YOU!